Antimicrobial Steward Call
April 20, 2021

Tennessee Department of Health
Healthcare Associated Infections and Antimicrobial Resistance Program

Welcome

Announcements

Upcoming Deadlines

- **April 30, 2021**
  - **For all:**
    - **TN AU Point Prevalence Survey - Q1 data**
    - **https://redcap.health.tn.gov/redcap/surveys/?s=yNpdMbPdDz**
  - **For NHSN AU Option Reporters**
    - **TN NHSN AU Quality Reports**
    - **NHSN AU Option – Q1 data**

AU Reporting Mandate - UPDATED

- **Bed size of >250 – First month submitted by January 1, 2022**
- **Bed size between 100–250 – January 1, 2023**
- **Bed size of < 100 and Critical Access Hospitals – January 1, 2024**
- **https://www.tn.gov/health/cedep/hai.html**
  - **“For Hospitals Only:”**

Hospital Point Prevalence AU Publications

Clinical Infectious Diseases

MAJOR ARTICLE

Antimicrobial Use in US Hospitals: Comparison of Results From Emerging Infections Program Prevalence Surveys, 2015 and 2011

Shelley S. Magill,[1] Erin O'Leary,[1,2] Susan M. Ray,[3,4] Marion A. Kainer,[5,a] Christopher Evans,[5] Wendy M. Bamberg,[6,b] Helen Johnston,[6] Sarah J. Janelle,[6] Tolulope Oyewumi,[6,c] Ruth Lynfield,[7] Jean Rainbow,[7] Linn Warnke,[7,d] Joelle Nadle,[8] Deborah L. Thompson,[9,e] Shamima Sharmin,[9,f] Rebecca Pierce,[10] Alexia Y. Zhang,[10] Valerie Ocampo,[10] Meghan Maloney,[11] Samantha Greissman,[11,g] Lucy E. Wilson,[12] Ghinwa Dumyati,[13] and Jonathan R. Edwards[1]; for the Emerging Infections Program Hospital Prevalence Survey Team

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Clinical Infectious Diseases, 2020;, ciaa373, https://doi.org/10.1093/cid/ciaa373

Background and Collection

- **Emerging Infections Program (EIP) – Hospital Point Prevalence Survey, 2011 and 2015**
- **10 EIP Sites each recruited ≥ 25 general, women's, and children's hospitals**
- **May–September 2015**
- **Data on antimicrobials used on day of survey or before collected**

Clinical Infectious Diseases, 2020;, ciaa373, https://doi.org/10.1093/cid/ciaa373

2015 survey results

- **12,299 patients in 199 hospitals**
- **6,084 (49.5%) received antimicrobials**
- **10,612 antimicrobial medications administered**
  - **parenteral vancomycin (1258, 11.9%)**
  - **cefazolin (1117, 10.5%)**
  - **ceftriaxone (1010, 9.5%)**
  - **piperacillin-tazobactam (827, 7.8%)**
  - **levofloxacin (798, 7.5%)**

Clinical Infectious Diseases, 2020;,
ciaa373, https://doi.org/10.1093/cid/ciaa373

Types of Antimicrobials, 2011 vs. 2015

Antimicrobial Group	2011 Survey (N = 9283)	2015 Survey (N = 9169)	
Fluoroquinolones	1104 (11.9)	930 (10.1)	<.001
Third-or fourth-generation cephalosporins	994 (10.7)	1115 (12.2)	.002
Glycopeptides	987 (10.6)	951 (10.4)	.56
Penicillin combinations, including β-lactamase inhibitors	845 (9.1)	796 (8.7)	.32
First-generation cephalosporins	791 (8.5)	897 (9.8)	.003
Macrolides	388 (4.2)	340 (3.7)	.10
Imidazole derivatives	346 (3.7)	378 (4.1)	.17
Triazole derivatives	301 (3.2)	293 (3.2)	.86
Carbapenems	247 (2.7)	337 (3.7)	<.001
Intestinal antibiotics	238 (2.6)	238 (2.6)	.89
Other antibacterials	144 (1.6)	94 (1.0)	.002
Tetracyclines	105 (1.1)	142 (1.5)	.01

Clinical Infectious Diseases, 2020;,
ciaa373, https://doi.org/10.1093/cid/ciaa373

AU Prevalence, 2011 vs. 2015

- **148 hospitals participated in both 2011 and 2015**
- **Overall AU prevalence did not differ from 2011 to 2015**
  - **2011: 4606 of 9283 patients (49.6%) received 8110 antimicrobial medications**
  - **2015: 4590 of 9169 patients (50.1%) received 8091 antimicrobial medications (*P* = .55)**
  - **Exception: Neonatal ICU**
    - **22.8% in 2015 and 32.0% in 2011 (*P* = .006)**

Clinical Infectious Diseases, 2020;, ciaa373, https://doi.org/10.1093/cid/ciaa373

	2011 Survey		2015 Survey		P[b]
Inpatient Location[a]	**Total No. of Patients**	**No. of Patients on Antimicrobial Medications (%)**	**Total No. of Patients**	**No. of Patients on Antimicrobial Medications (%)**	
Adult critical care, all	955	610 (63.9)	921	573 (62.2)	.46
Adult non–critical care, all	6294	3382 (53.7)	6143	3406 (55.5)	.06
Pediatric critical care, all	96	66 (68.8)	109	70 (64.2)	.50
Pediatric non–critical care, all	469	244 (52.0)	470	241 (51.3)	.82
Neonatal critical care, all	337	108 (32.0)	372	85 (22.8)	.006
Neonatal non–critical care, all	396	24 (6.1)	344	21 (6.1)	.98
Mother–baby units, all	728	167 (22.9)	798	188 (23.6)	.78

[a]Excludes 20 patients (8 in the 2011 survey and 12 in the 2015 survey) in mixed-age locations.
[b]Mid-*P* exact test.

Clinical Infectious Diseases, 2020;, ciaa373, https://doi.org/10.1093/cid/ciaa373

JAMA Network | Open

Original Investigation | Infectious Diseases

Assessment of the Appropriateness of Antimicrobial Use in US Hospitals

Shelley S. Magill, MD, PhD; Erin O'Leary, MPH; Susan M. Ray, MD; Marion A. Kainer, MBBS, MPH; Christopher Evans, PharmD; Wendy M. Bamberg, MD; Helen Johnston, MPH; Sarah J. Janelle, MPH; Tolulope Oyewumi, MD, MPH; Ruth Lynfield, MD; Jean Rainbow, MPH, RN; Linn Warnke, RN, MPH; Joelle Nadle, MPH; Deborah L. Thompson, MD, MSPH; Shamima Sharmin, MBBS, MSc, MPH; Rebecca Pierce, PhD, MS, BSN; Alexia Y. Zhang, MPH; Valerie Ocampo, MIPH, RN, BSN; Meghan Maloney, MPH; Samantha Greissman, MD, MPH; Lucy E. Wilson, MD, ScM; Ghinwa Dumyati, MD; Jonathan R. Edwards, MStat; Nora Chea, MD, MS; Melinda M. Neuhauser, PharmD, MPH; for the Emerging Infections Program Hospital Prevalence Survey Team

- **What percentage of hospital antimicrobial use in the US deviates from recommended practices, such as treatment selection or duration, on the basis of medical record documentation?**

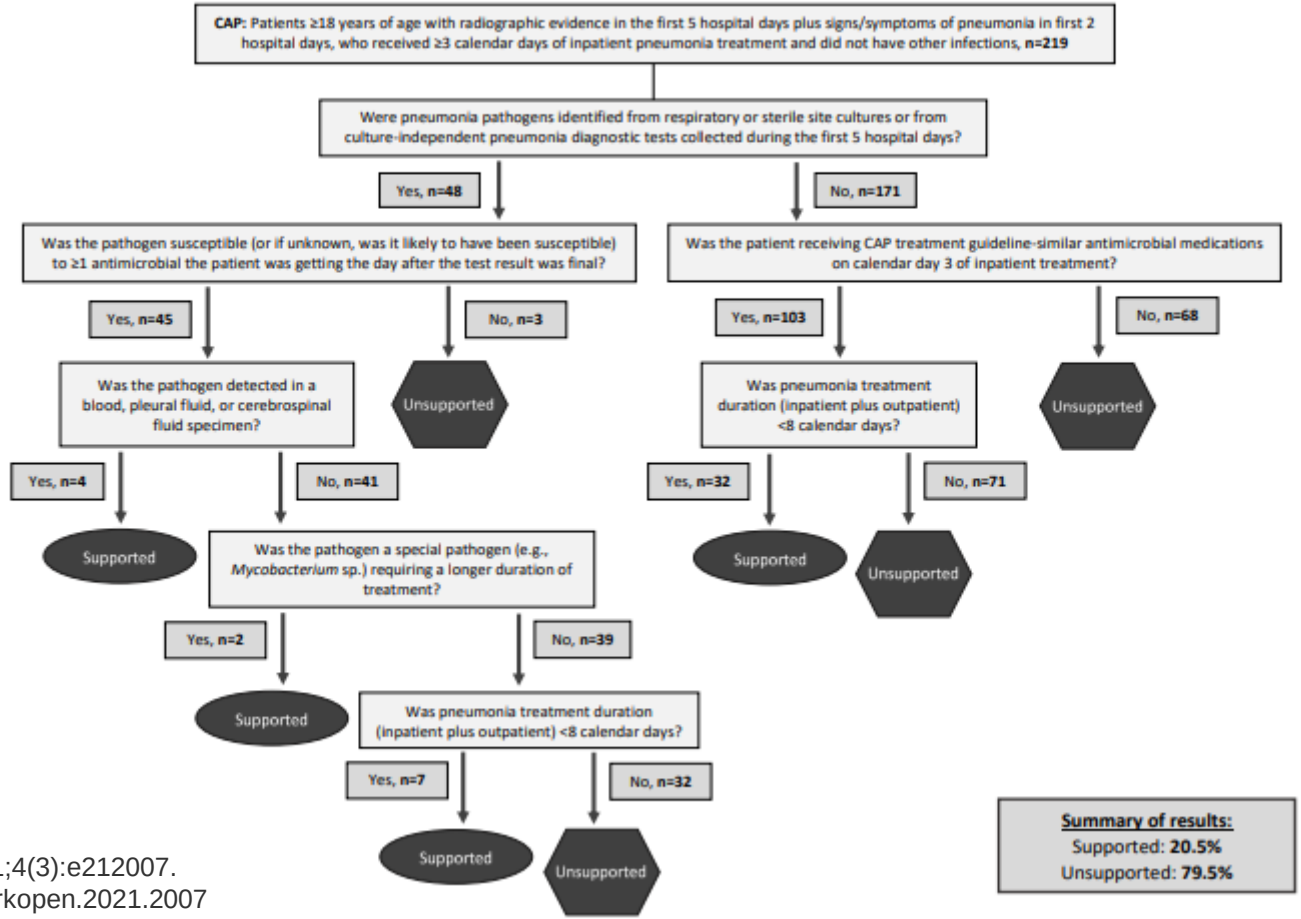
JAMA Netw Open. 2021;4(3):e212007.
doi:10.1001/jamanetworkopen.2021.2007

TN

- **Data collected from 2015 Hospital Point Prevalence Survey**
- **Subgroups of patients that had one of four qualifying antimicrobial events:**
  - **Receipt of parenteral vancomycin**
  - **Receipt of fluoroquinolones**
  - **Treatment of community-acquired pneumonia (CAP)**
  - **Treatment of urinary tract infection (UTI)**
- **Developed antimicrobial quality assessment (AQUA) tools for each event**

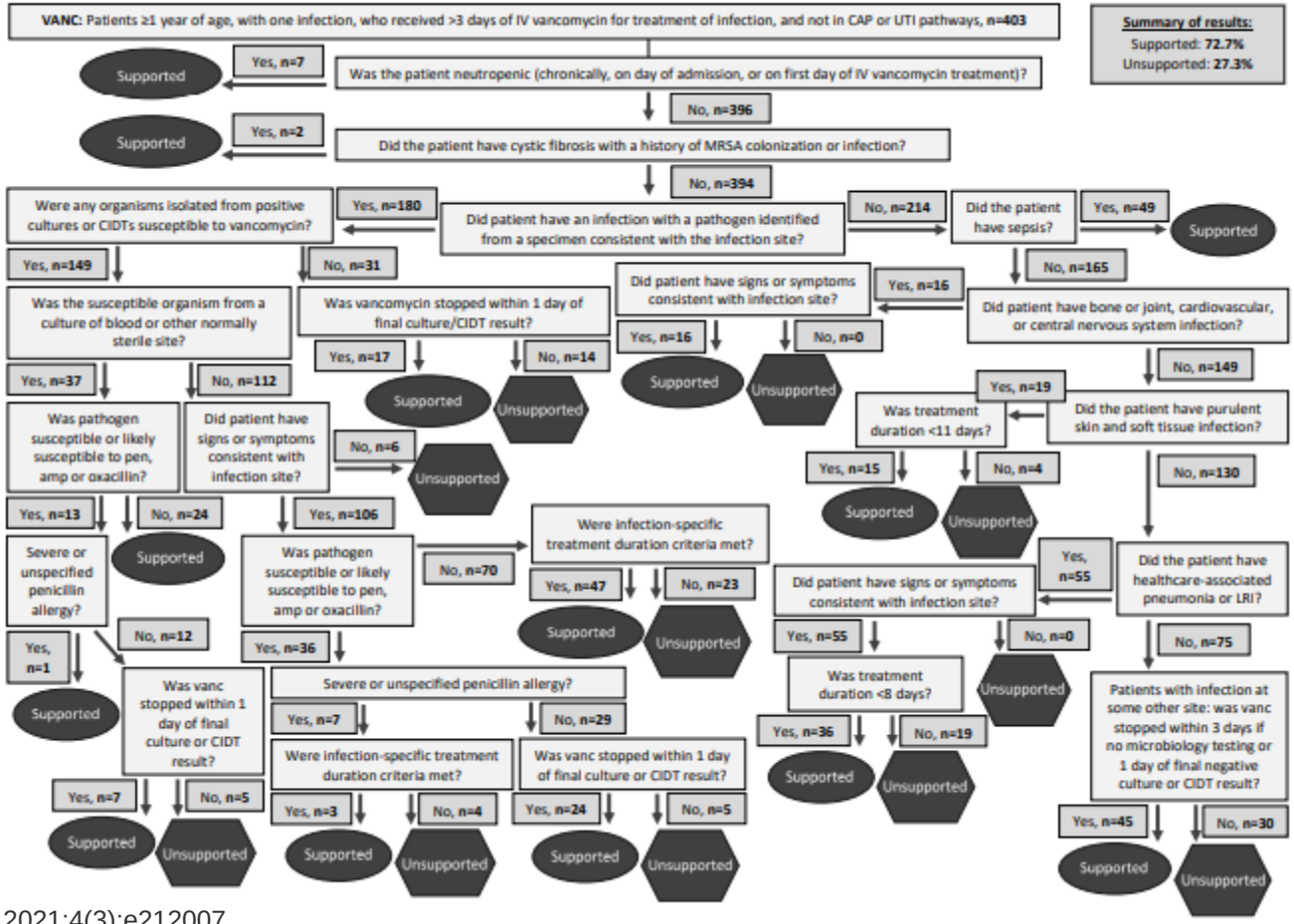
JAMA Netw Open. 2021;4(3):e212007.
doi:10.1001/jamanetworkopen.2021.2007

eFigure 5. Community-acquired pneumonia (CAP) analysis pathway.



JAMA Netw Open. 2021;4(3):e212007.
doi:10.1001/jamanetworkopen.2021.2007

eFigure 8. Intravenous vancomycin treatment (VANC) analysis pathway.



JAMA Netw Open. 2021;4(3):e212007.
doi:10.1001/jamanetworkopen.2021.2007

Results

- **Overall, treatment was UNSUPPORTED in the majority of patients that received antibiotics in this study**
  - **876 of 1566 patients, 55.9%**

- **Unsupported treatment broken down by treatment event:**
  - **110 of 403 (27.3%) patients who received vancomycin**
  - **256 of 550 (46.6%) patients who received fluoroquinolones**
  - **347 of 452 (76.8%) patients with a diagnosis of UTI**
  - **174 of 219 (79.5%) patients with a diagnosis of CAP**

JAMA Netw Open. 2021;4(3):e212007.
doi:10.1001/jamanetworkopen.2021.2007

Reasons for Unsupported Therapy

- **Most common**
  - **Excessive duration of therapy**
  - **Lack of documentation of signs and symptoms for infection.**

JAMA Netw Open. 2021;4(3):e212007.
doi:10.1001/jamanetworkopen.2021.2007

Other HPPS Publications

- Assessment of the Appropriateness of Antimicrobial Use in US Hospitals
  - https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2777635
- Antimicrobial Use in US Hospitals: Comparison of Results From Emerging Infections Program Prevalence Surveys, 2015 and 2011
  - https://academic.oup.com/cid/advance-article/doi/10.1093/cid/ciaa373/5855453
- Prevalence of Antimicrobial Use in US Acute Care Hospitals, May-September 2011
  - https://jamanetwork.com/journals/jama/fullarticle/1911328
- Multistate Point-Prevalence Survey of Health Care–Associated Infections
  - https://www.nejm.org/doi/10.1056/NEJMoa1306801?url_ver=Z39.88-2003&rfr_id=ori%3Arid%3Acrossref.org&rfr_dat=cr_pub++0www.ncbi.nlm.nih.gov
- Changes in Prevalence of Health Care–Associated Infections in U.S. Hospitals
  - https://www.nejm.org/doi/10.1056/NEJMoa1801550?url_ver=Z39.88-2003&rfr_id=ori:rid:crossref.org&rfr_dat=cr_pub%20%200pubmed

Hospital Point Prevalence 2022, Phase 5

Postponed in 2020 and 2021, confirmed for 2022

Sample Size:

- **Overall Number of patients: ~ 12,000**
- **Number of hospitals in TN: 25**
  - **Small hospitals (0–150 beds): up to 75 randomly selected patients**
  - **Medium hospitals (151–399 beds): 75 randomly selected patients**
  - **Large hospitals (400+ beds): 100 randomly selected patients**
- **All randomly selected patients will receive complete medical record abstraction**

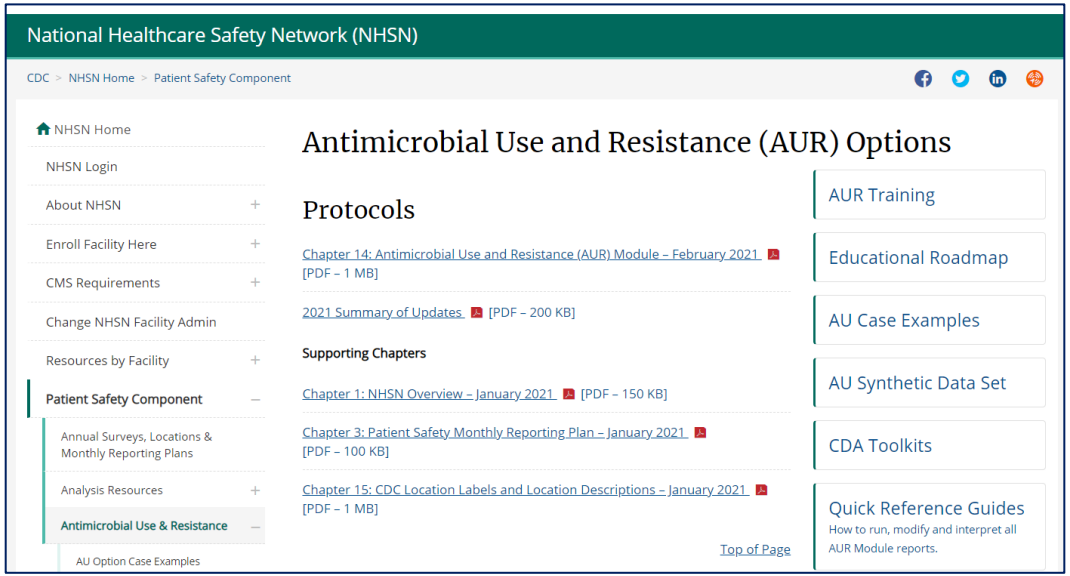
NHSN SAAR Discussion - CDC

NHSN Webpage Updates

Amy Webb

NHSN & AUR Module Webpage Redesign

- The NHSN webpages were redesigned & released on February 9
- Quick reference guide about the changes: https://www.cdc.gov/nhsn/pdfs/commup/psc-refresh-508.pdf

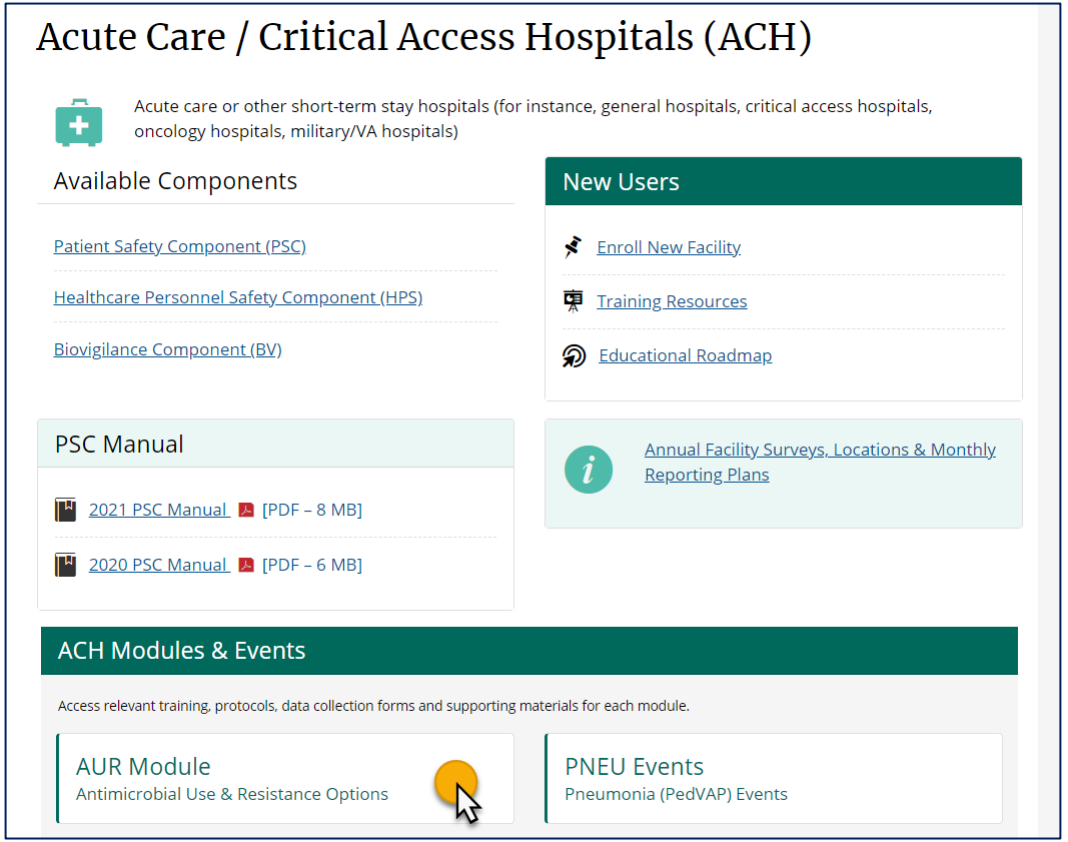


NHSN Home Page

- NHSN: https://www.cdc.gov/nhsn/index.html
  - Navigating to the AUR Module page
    - Resources by Facility: Acute Care/Critical Access Hospitals

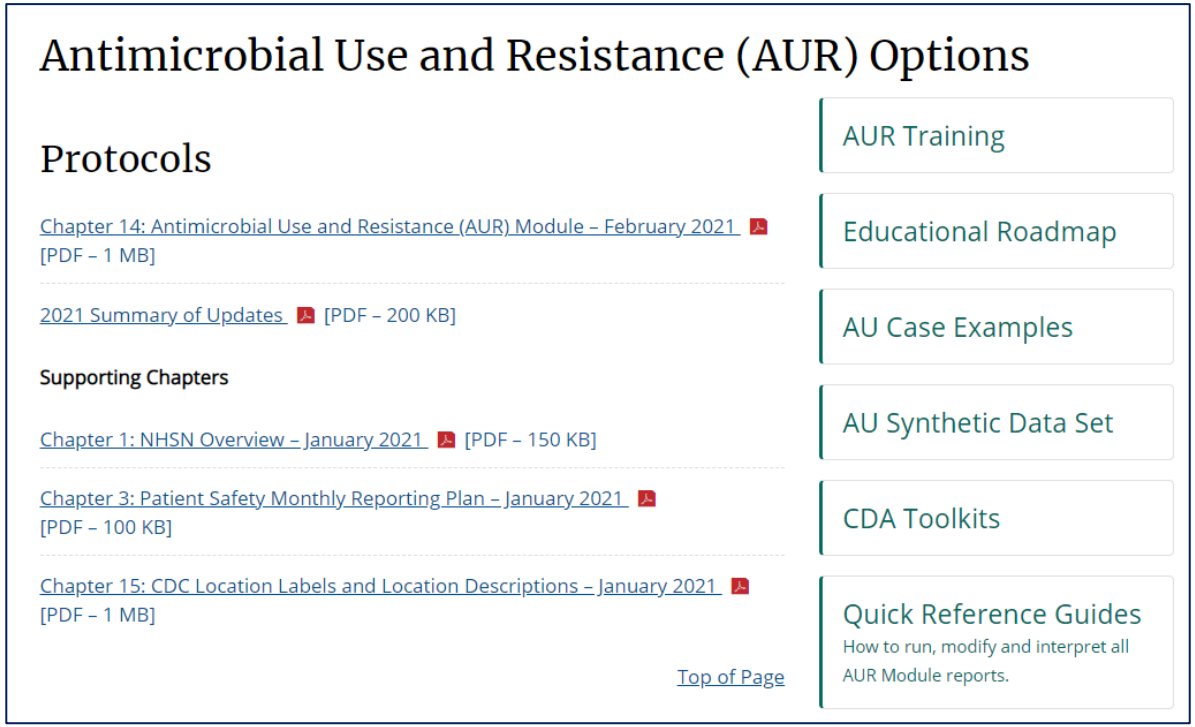
NHSN Home Page

- NHSN: https://www.cdc.gov/nhsn/index.html
  - Navigating to the AUR Module page
    - Resources by Facility: Acute Care/Critical Access Hospitals
    - ACH Modules & Events: AUR Module



AUR Module Home Page

- Direct link: https://www.cdc.gov/nhsn/psc/aur/index.html



Newly Posted Materials

Amy Webb & Lindsay Dunham

Training Timestamps

- Provide timestamps of important sections in both the AU Option and AR Option training videos
- Allows a user who wants to view a specific part of a training video to navigate to that specific time rather than watch entire video looking for specific part
- Located with their associated training videos on the AUR Training page: https://www.cdc.gov/nhsn/training/patient-safety-component/aur.html

Training Timestamps

AUR Training

Training Videos

Antibiotic Stewardship – May 2019

- YouTube Link [Video – 27 min]
- Slideset [PDF – 2 MB]

Antimicrobial Use (AU) Option: Reporting and Analysis – May 2020

- YouTube Link [Video – 50 min]
- Time stamps by section [PDF – 250 KB]
- Slideset [PDF – 4 MB]

Antimicrobial Resistance (AR) Option: Reporting and Analysis – May 2019

- **Review updated AR slides for 2020 [PDF – 1 MB]**
- YouTube Link [Video – 49 min]
- Time stamps by section [PDF – 200 KB]
- Slideset [PDF – 6 MB]

Training Timestamps

Time Stamps for the 2020 NHSN Training – Antimicrobial Use Option: Reporting and Analysis

AU Option Reporting & Analysis – Amy Webb

AU Option Reporting

- NHSN structure and where the AU Option sits within NHSN: 1:42
- AU Option overview: 2:15
- AU & CMS promoting Interoperability Program: 3:35
- Who can participate in AU Option: 4:45
- AU Option data elements –Antimicrobial days (Days of Therapy) numerator: 6:40
  - Counting antimicrobial days: 7:51
    - Total vs sub-stratified routes: 9:15
    - Sum of the routes: 11:06
- AU Option data elements – denominators: 11:50
  - Days present: 12:00
  - Admissions: 13:17
  - Counting days present: 13:45
  - Frequency for reporting aggregate denominator (summary level) data: 16:47
    - Locations included: 17:16

AU Drug Updates

2018	2019	2020	2021
Delafloxacin	Meropenem/Vaborbactam	Amikacin Liposome	Amphotericin B lipid complex*
		Baloxavir marboxil	Cefiderocol
		Colistin*	Lefamulin
		Eravacycline	Imipenem/cilastatin/relebactam
		Omadacycline	Doripenem
		Plazomicin	Erythromycin/Sulfisoxazole
		Remdesivir**	Piperacillin
		Cefditoren	
		Ceftibuten	
		Ceftizoxime	
		Sulfisoxazole	
		Telithromycin	
		Ticarcillin/Clavulanate	

*added separately due to RxNorm

**added July 2020

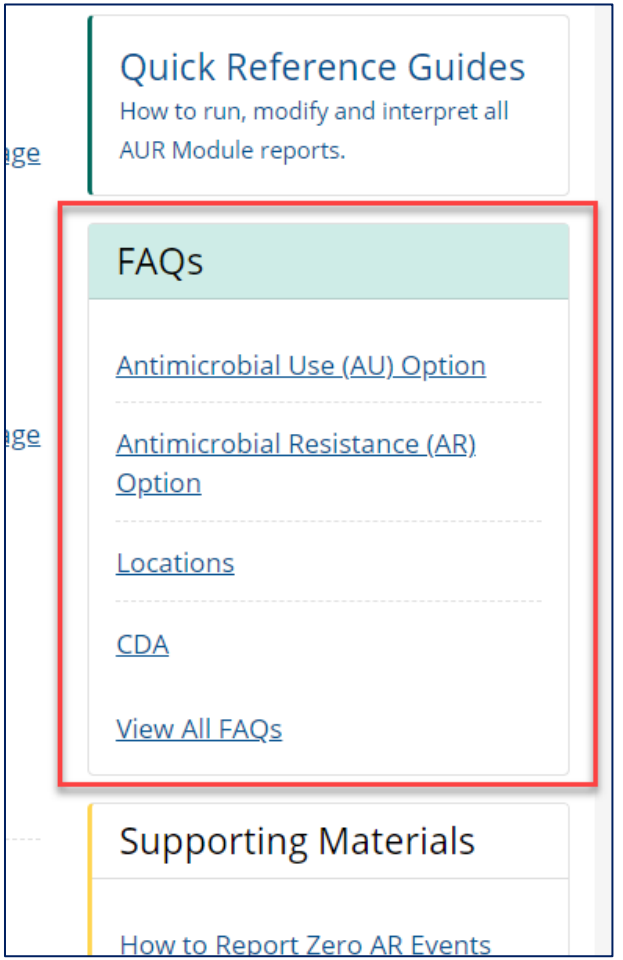
2021 Eligible Antimicrobial Agents

- Excel list of Antimicrobial Agents eligible for the AUR Module is found in the Supporting Materials section of the AUR page: https://www.cdc.gov/nhsn/xls/aur/aur-eligible-antimicrobial-agents.xlsx

FAQs

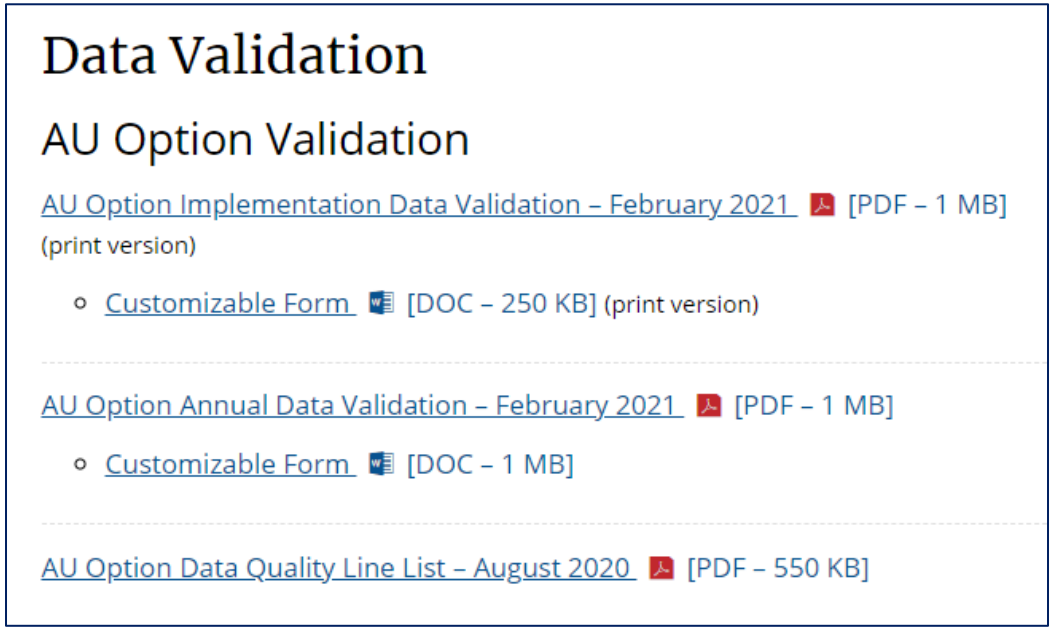
- Reviewed and updated

- AU: https://www.cdc.gov/nhsn/faqs/faq-au.html
- AR: https://www.cdc.gov/nhsn/faqs/faq-ar.html



AU Validation Protocols

- Reviewed and updated both Implementation & Annual AU Validation Protocols: https://www.cdc.gov/nhsn/psc/aur/index.html



Data Validation

AU Option Validation

AU Option Implementation Data Validation – February 2021 [PDF – 1 MB] (print version)

- Customizable Form [DOC – 250 KB] (print version)

AU Option Annual Data Validation – February 2021 [PDF – 1 MB]

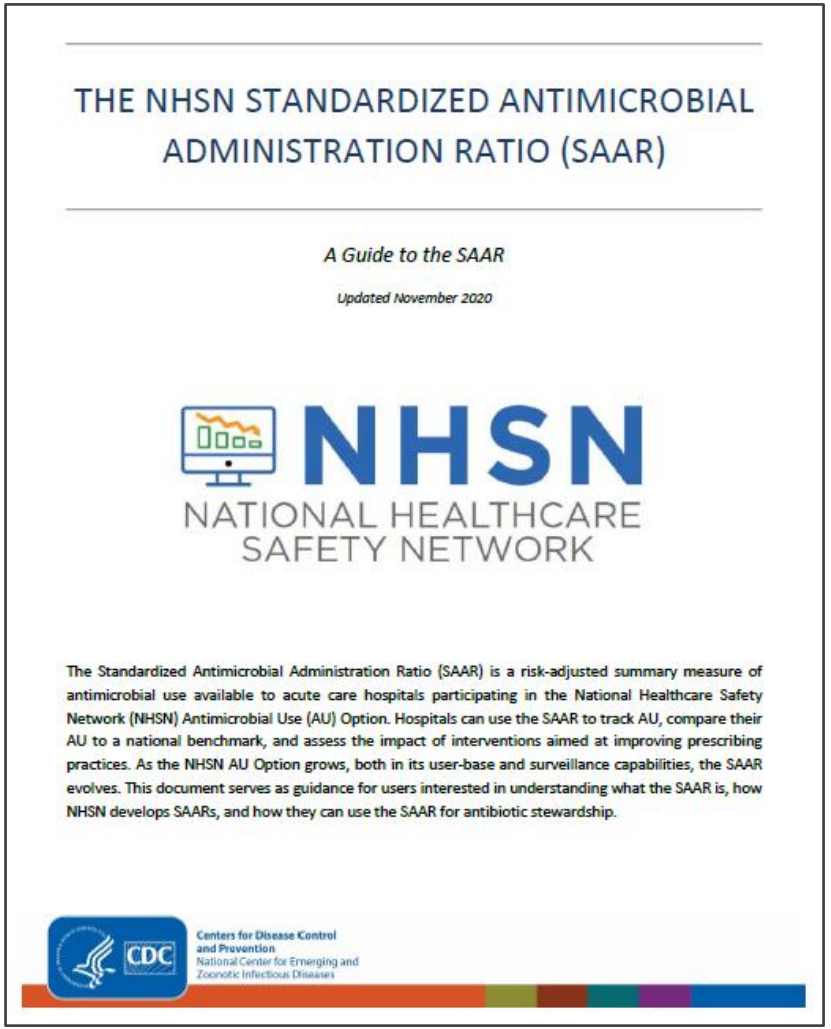
- Customizable Form [DOC – 1 MB]

AU Option Data Quality Line List – August 2020 [PDF – 550 KB]

SAAR Guide

- Now online: https://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/aur/au-saar-guide-508.pdf

- Purpose: serve as guidance for users interested in understanding what the SAAR is, how NHSN develops SAARs, and how they can use the SAAR for antibiotic stewardship



THE NHSN STANDARDIZED ANTIMICROBIAL ADMINISTRATION RATIO (SAAR)

A Guide to the SAAR

Updated November 2020

NHSN
NATIONAL HEALTHCARE SAFETY NETWORK

The Standardized Antimicrobial Administration Ratio (SAAR) is a risk-adjusted summary measure of antimicrobial use available to acute care hospitals participating in the National Healthcare Safety Network (NHSN) Antimicrobial Use (AU) Option. Hospitals can use the SAAR to track AU, compare their AU to a national benchmark, and assess the impact of interventions aimed at improving prescribing practices. As the NHSN AU Option grows, both in its user-base and surveillance capabilities, the SAAR evolves. This document serves as guidance for users interested in understanding what the SAAR is, how NHSN develops SAARs, and how they can use the SAAR for antibiotic stewardship.

CDC
Centers for Disease Control and Prevention
National Center for Emerging and Zoonotic Infectious Diseases

SAAR Guide: table of contents

- Overview of the SAAR
  - What is the SAAR?
  - How does NHSN calculate the SAAR?
  - Why risk-adjust?
  - Why not use stratified rates to make AU comparison?
- SAAR Model Development
  - Defining the referent population
  - Defining SAAR antimicrobial agent categories
  - The SAAR predictive model development process

SAAR Guide: table of contents

- SAARs in NHSN
  - Finding and reading SAAR reports
  - Interpreting the SAAR
  - Example SAAR interpretation
  - Example SAAR calculation

SAAR Guide: risk-adjustment demonstration

- NHSN uses negative binomial regression for AU risk-adjustment
- The model uses a set of fixed parameters (adjustment variables) for each SAAR type to predict risk of AU in a set of SAAR-locations
- Below is the general formula for a negative binomial model:

$$log\ (\lambda) = \alpha + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_i X_i, \text{ where:}$$

α = Intercept

β_i = Parameter estimate

X_i = Value of risk factor (categorical variables: 1 if present, 0 if not present)

i = Number of predictors

SAAR Guide: risk-adjustment demonstration

- Example: calculate number of predicted antimicrobial days (SAAR denominator) for adult BSHO antimicrobial agents

Factor	Parameter Estimate
Intercept	-2.3357
Location type = Medical ICU	1.0084
Location type = Medical-Surgical ICU, Surgical ICU	0.8825
Location type = General Hematology-Oncology Ward	0.3795
Location type = Step down Unit	0.2197
Location type = Medical Ward	0.0781
Veteran's Affairs hospital (facility type = HOSP-VA)	-0.1821
Critical access hospital (facility type = HOSP-CAH)	-0.2465
Military hospital (facility type = HOSP-MIL)	-0.6278
Women's hospital (facility type = HOSP-WOM)	-1.1920
≥8 ICU beds	0.1734
≥3.6 average length of stay, facility-wide (in days)	0.1091
Undergraduate teaching facility	0.1394

Predicted DOT

= **Exp [**-2.3357
+ 1.0084 (Location type: Medical ICU)
+ 0.8825 (Location type: Med-Surg ICU, Surgical ICU)
+ 0.3795 (Location type: Hematology-Oncology Ward)
+ 0.2197 (Location type: Step-down Unit)
+ 0.0781 (Location type: Medical Ward)
+ -0.1821 (Facility type: VA hospital)
+ -0.2465 (Facility type: Critical access hospital)
+ -0.6278 (Facility type: Military hospital)
+ -1.1920 (Facility type: Women's hospital)
+ 0.1734 (ICU beds: ≥8)
+ 0.1091 (Average length of stay: ≥3.6 days)
+ 0.1394 (Teaching status: undergraduate) **] x # days present**

Data for example only

SAAR Guide: risk-adjustment demonstration

- Example: calculate predicted adult BSHO DOT for an adult surgical ward reporting January 2019. This ward is in a critical access hospital enrolled in NHSN as non-teaching with 2 ICU beds and an average length of stay of 4 days. The hospital reported 3 DOT and 30 days present for this location/month.

Predicted DOT

= **Exp [**-2.3357

+ 1.0084 (Location type: Medical ICU) → (0)
+ 0.8825 (Location type: Med-Surg ICU, Surgical ICU) → (0)
+ 0.3795 (Location type: Hematology-Oncology Ward) → (0)
+ 0.2197 (Location type: Step-down Unit) → (0)
+ 0.0781 (Location type: Medical Ward) → (0)
+ -0.1821 (Facility type: VA hospital) → (0)
+ -0.2465 (Facility type: Critical access hospital) → (1)
+ -0.6278 (Facility type: Military hospital) → (0)
+ -1.1920 (Facility type: Women's hospital) → (0)
+ 0.1734 (ICU beds: ≥8) → (0)
+ 0.1091 (Average length of stay: ≥3.6 days) → (1)
+ 0.1394 (Teaching status: undergraduate) → (0)

] x # days present

= $e^{[-2.3357 + -0.2465 + 0.1091]}$ **x 30 days present**

= $e^{[-2.4731]}$ **x 30 days present**

= 0.0843 **x 30 days present**

= **2.5297 predicted antimicrobial days**

Data for example only

SAAR Guide: risk-adjustment demonstration

- To calculate a SAAR for this location/month, divide observed antimicrobial days by predicted antimicrobial days:

$$SAAR = \frac{3\ Observed\ antimicrobial\ days\ of\ therapy}{2.530\ Predicted\ antimicrobial\ days\ of\ therapy} = 1.186$$

- Interpretation: use of BSHO antibacterial agents in this adult surgical ward in January 2019 was 1.2 times higher than predicted

Data for example only

AU Data Report

- Now online: https://www.cdc.gov/antibiotic-use/core-elements/hospital.html

- Purpose: show first summary of SAAR distributions and percentages of use within SAAR antimicrobial agent categories in adult, pediatric, and neonatal patient care locations
  - SAAR distributions can inform stewardship efforts by enabling hospitals to see how their SAARs compare to the national distribution
  - The percentage of AU by class and drug within a SAAR agent category provides insight into prescribing practices across differing patient locations

Characteristics of Acute Care Hospitals Reporting to NHSN AU Option in 2019

Table 1a. Characteristics of Acute Care Hospitals reporting to NHSN AU Option from **Adult** SAAR Locations for ≥9 months in 2019 (n=1,222)[1]

Hospital Type	**No. (%)[2]**
Critical access	108 (8.8)
Children's	NA
General acute care	961 (78.6)
Military	43 (3.5)
Oncology	2 (0.2)
Surgical	7 (0.6)
Veteran Affairs	96 (7.9)
Women's	3 (0.2)
Women and children's	2 (0.2)
Medical School Affiliation	**No. (%)**
None	348 (28.5)
Undergraduate[3]	178 (14.6)
Graduate[4]	219 (17.9)
Major Teaching[5]	477 (39.0)
Facility size	**Median (IQR)**
Number of beds	164 (73, 310)
Number of ICU beds	20 (8, 44)

Table 1b. Characteristics of Acute Care Hospitals reporting to NHSN AU Option from **Pediatric** SAAR Locations for ≥9 months in 2019 (n=287)[1]

Hospital Type	**No. (%)[2]**
Critical access	NA
Children's	25 (8.7)
General acute care	252 (87.8)
Military	8 (2.8)
Oncology	NA
Surgical	NA
Veteran Affairs	NA
Women's	NA
Women and children's	2 (0.7)
Medical School Affiliation	**No. (%)**
None	29 (10.1)
Undergraduate[3]	33 (11.5)
Graduate[4]	51 (17.8)
Major Teaching[5]	174 (60.6)
Facility size	**Median (IQR)**
Number of beds	349 (246, 501)
Number of ICU beds	65 (35, 102)

Table 1c. Characteristics of Acute Care Hospitals reporting to NHSN AU Option from **Neonatal** SAAR Locations for ≥9 months in 2019 (n=475)[1]

Hospital Type	**No. (%)[2]**
Critical access	NA
Children's	21 (4.4)
General acute care	434 (91.4)
Military	11 (2.3)
Oncology	NA
Surgical	NA
Veteran Affairs	NA
Women's	5 (1.1)
Women and children's	4 (0.8)
Medical School Affiliation	**No. (%)**
None	72 (15.2)
Undergraduate[3]	57 (12.0)
Graduate[4]	76 (16.0)
Major Teaching[5]	270 (56.8)
Facility size	**Median (IQR)**
Number of beds	314 (208, 448)
Number of ICU beds	52 (30, 88)

Table 2b. Adult broad spectrum antibacterial agents predominantly used for hospital-onset infections (Adult BSHO)

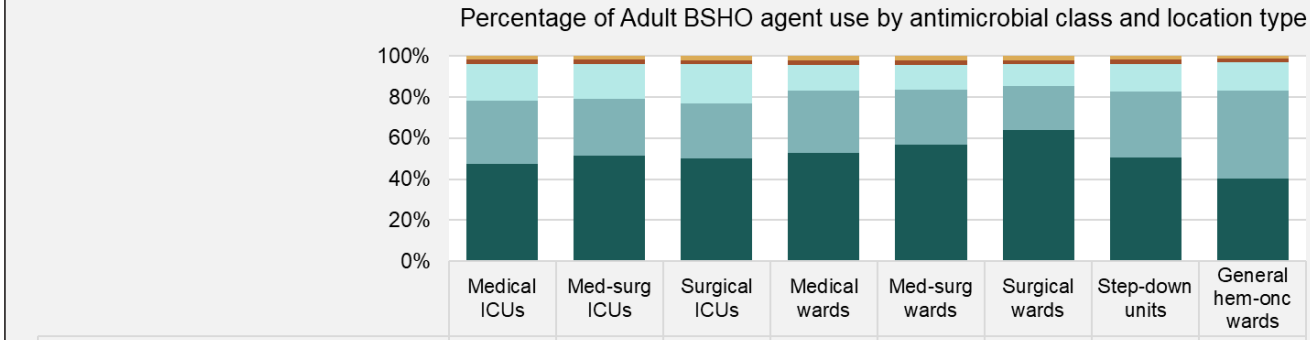
Table 2b1: Adult BSHO SAAR distributions, by SAAR location type

			Antimicrobial days		SAAR and 95% confidence limits (CL)		
Adult SAAR location type	No. of locations[1]	Days present	Observed	Predicted	SAAR	Lower CL	Upper CL
Medical ICUs	352	1,748,446	582,868	595,505.94	0.979	0.976	0.981
Medical-surgical ICUs	823	4,086,757	1,255,990	1,247,645.28	1.007	1.005	1.008
Surgical ICUs	184	898,292	259,343	275,157.32	0.943	0.939	0.946
Medical wards	1259	12,586,212	1,676,203	1,706,026.49	0.983	0.981	0.984
Medical-surgical wards	1745	15,940,279	2,151,698	1,977,921.10	1.088	1.086	1.089
Surgical wards	620	6,113,517	807,780	773,929.38	1.044	1.041	1.046
Step down units	726	6,074,286	904,420	969,799.96	0.933	0.931	0.934
General hematology-	215	1,933,300	380,513	362,009.98	1.051	1.048	1.054

	Percentile distribution of location-specific SAARs																	
No. of locations with ≥1 predicted antimicrobial day[2]	5th	10th	15th	20th	25th	30th	35th	40th	45th	50th	55th	60th	65th	70th	75th	80th	85th	90th	95th
352	0.391	0.589	0.647	0.722	0.778	0.823	0.872	0.909	0.946	0.977	1.020	1.068	1.114	1.161	1.203	1.248	1.300	1.355	1.487
823	0.456	0.563	0.650	0.725	0.796	0.847	0.887	0.929	0.977	1.027	1.057	1.094	1.138	1.184	1.240	1.286	1.360	1.442	1.590
184	0.425	0.522	0.585	0.631	0.665	0.734	0.790	0.820	0.856	0.886	0.913	0.945	1.034	1.080	1.124	1.188	1.297	1.394	1.540
1259	0.251	0.401	0.507	0.594	0.673	0.737	0.804	0.866	0.919	0.985	1.032	1.087	1.134	1.195	1.262	1.329	1.413	1.532	1.731
1745	0.302	0.450	0.563	0.658	0.732	0.808	0.875	0.938	1.012	1.077	1.133	1.199	1.264	1.329	1.404	1.484	1.584	1.711	1.921
620	0.210	0.424	0.510	0.583	0.658	0.748	0.816	0.879	0.926	1.007	1.059	1.115	1.172	1.242	1.313	1.391	1.477	1.612	1.790
726	0.231	0.365	0.460	0.526	0.584	0.644	0.705	0.778	0.864	0.933	0.982	1.060	1.156	1.224	1.291	1.369	1.539	1.688	1.858
215	0.481	0.647	0.719	0.776	0.814	0.856	0.884	0.919	0.943	0.998	1.031	1.076	1.114	1.182	1.305	1.336	1.427	1.695	2.116

Table 2b2. Adult BSHO usage by antimicrobial agent and SAAR location type

Adult SAAR location type (n)[1]	Antimicrobial[2]	Antimicrobial Class	Antimicrobial Subclass	Pooled antimicrobial days	Percentage of antimicrobial days
Medical ICUs (n=329)	Piperacillin/Tazobactam	B-lactam/B-lactamase inhibitor combination		256,998	47.2
	Cefepime	Cephalosporins	Cephalosporin 4th generation	161,123	29.6
	Meropenem	Carbapenems		97,919	18.0
	Aztreonam (IV)	Monobactams		10,211	1.9
	Ceftazidime	Cephalosporins	Cephalosporin 3rd generation	7,485	1.4
	Gentamicin (IV)	Aminoglycosides		4,082	0.8
	Tobramycin (IV)	Aminoglycosides		3,339	0.6
	Amikacin (IV)	Aminoglycosides		2,221	0.4
	Imipenem/Cilastatin	Carbapenems		1,247	0.2
	Doripenem	Carbapenems		5	0.0



	Medical ICUs	Med-surg ICUs	Surgical ICUs	Medical wards	Med-surg wards	Surgical wards	Step-down units	General hem-onc wards
Aminoglycosides	1.8	1.5	2.1	1.9	2.1	2.1	1.5	1.0
Monobactams	1.9	2.4	1.7	2.4	2.2	1.8	2.2	2.0
Carbapenems	18.2	16.8	19.6	12.8	12.0	10.5	13.7	14.0
Cephalosporins	31.0	27.9	26.7	30.3	27.1	21.8	32.2	42.9
B-lactam/B-lactamase inhibitor combination	47.2	51.5	50.0	52.7	56.6	63.7	50.5	40.2

Next Steps

- **Next Call**
  - **June 8 (?) 2pm Eastern/1pm Central Time**
  - **Topic TBD**

- **Feedback always appreciated**
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